

Drug Dosage Calculation Guide

Calculating drug doses is a critical skill for nurses, pharmacists, and other healthcare providers to ensure patient safety and effective treatment. Here's an explanation with examples and rationale:

General Formula for Dosage Calculation:

The basic formula used is:

$$\text{Dose to Administer (DA)} = (\text{Desired Dose (DD)} / \text{Available Dose (AD)}) \times \text{Quantity (Q)}$$

Where:

- Desired Dose (DD): The prescribed amount of medication.
 - Available Dose (AD): The concentration or dose available in the supply.
 - Quantity (Q): The volume or number of units that contain the Available Dose.
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Example 1: Oral Medication

Scenario: A physician orders 500 mg of Amoxicillin, but you have 250 mg tablets available. How many tablets should be administered?

Solution:

- DD = 500 mg
- AD = 250 mg
- Q = 1 tablet

$$\text{DA} = (500 / 250) \times 1 = 2 \text{ tablets}$$

Rationale: The patient needs 500 mg, and each tablet contains 250 mg. Two tablets will provide the

correct dose.

Example 2: Liquid Medication

Scenario: A child is prescribed 150 mg of Ibuprofen. The liquid medication available is 100 mg/5 mL.

How many milliliters should you administer?

Solution:

- DD = 150 mg

- AD = 100 mg

- Q = 5 mL

$$DA = (150 / 100) \times 5 = 7.5 \text{ mL}$$

Rationale: To provide 150 mg, you calculate how much liquid contains that amount based on the concentration (100 mg in 5 mL). Administering 7.5 mL will give the correct dose.

Example 3: Intravenous (IV) Infusion

Scenario: An order requires 400 mg of a drug to be infused. The IV bag contains 800 mg in 500 mL.

How many mL should be administered?

Solution:

- DD = 400 mg

- AD = 800 mg

- Q = 500 mL

$$DA = (400 / 800) \times 500 = 250 \text{ mL}$$

Rationale: To deliver 400 mg from a bag with 800 mg in 500 mL, you calculate the proportionate volume that contains 400 mg, which is 250 mL.

Example 4: Weight-Based Dosing

Scenario: A patient weighs 70 kg, and the order is for 5 mg/kg of medication. How many milligrams should be administered?

Solution:

- Weight = 70 kg
- Dose per kg = 5 mg

$$DA = 70 \times 5 = 350 \text{ mg}$$

Rationale: Multiply the patient's weight by the dose per kilogram to calculate the total dose.

Common Pitfalls to Avoid:

1. Unit Mismatch: Ensure all units match (e.g., mg with mg, mL with mL).
 2. Accuracy: Always double-check calculations, especially for critical drugs.
 3. Patient Safety: Confirm patient-specific factors like weight, age, and renal function.
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Additional Tips:

- Use dimensional analysis if the formula approach feels unclear: Set up conversions so units cancel out to get the desired unit.
- Always verify calculations with a second nurse or pharmacist for high-risk medications.

By understanding and applying these methods, you'll ensure accurate and safe dosing for your patients.
